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- IV. "Second Supplementary Paper on the Calculation of the Numerical Value of Euler's Constant." By WILLIAM SHANKS, Houghton-le-Spring, Durham. Communicated by the Rev. Professor PRICE, F.R.S. Received August 29, 1867.

When  $n=2000$ , we have

$$1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{2000} \\ = 8.17836 \ 81036 \ 10282 \ 40957 \ 76565 \ 71641 \ 69368 \ 79354 \\ 66740 \ 91251 \ 77402 \ 20409 \ 26320 \ 14205 \ 58039 \ 78429 \\ 87946 \ 27554 \ 87631 \ 13645 + \\ E = 5.7721 \ 56649 \ 01532 \ 86060 \ 65120 \ 90082 \ 40243 \ 10421 \ 59335 \\ 93995 \ 35988 \ 05772 \ 51046 \ 48794 \ 94723 \ 80546 \text{ (last term is } \\ \frac{B_{12}}{24 \cdot 2000^{24}}).$$

Here the 60th decimal place in the value of  $E$  is the same when  $n$  is 2000 as it is when  $n$  is 1000.

When  $n=500$ , we have in the value of  $E$ , 60th }  
decimal and onwards . . . . . }

1 53865 48677 &c.  
" 1000, " " " 2 02455 61942 &c.  
" 2000, " " " 2 51046 48794 &c.

By subtracting the first of these three from the }  
second, we have . . . . . }

By subtracting the second from the third, we have 48590 86852

It is somewhat remarkable that these differences are the same to five places of decimals; and it may be observed that the value of  $E$  will probably be changed and extended very slowly indeed by employing higher values of  $n$ . The remark in the previous Supplementary Paper\*, as to  $n$  being 50000 or even 100000 in order to obtain probably about 100 places of decimals in  $E$ , seems, the author now thinks, to be not well founded; and he hesitates even to conjecture what number of terms of the Harmonic Progression should be "summed" to ensure accuracy in the value of  $E$  to 100 decimals.

\* Proceedings, vol. xv. p. 429.